

## ABSTRACT OF THE DISCLOSURE

[0214] An optical interrogation system 10 includes optical amplifying and gating apparatus, in the form of a semiconductor optical amplifier (SOA) 14 and an optical source 12, 14. Drive apparatus 22 (an electrical pulse generator driven by a variable frequency oscillator) is provided to generate electrical drive pulses (see inset (a)) which are applied to the SOA 14, to cause the SOA 14 to switch on and off. The optical source comprises a super-luminescent diode (SLD) 12, the CW output from which is gated into optical pulses by the SOA 14. The SOA 14 is optically coupled to the waveguide 16 containing an array of reflective optical elements (gratings G) to be interrogated. The interrogation system further includes an optical detector 18, optically coupled to the SOA 14, operable to evaluate the wavelength of a returned optical pulse transmitted by the SOA 14.